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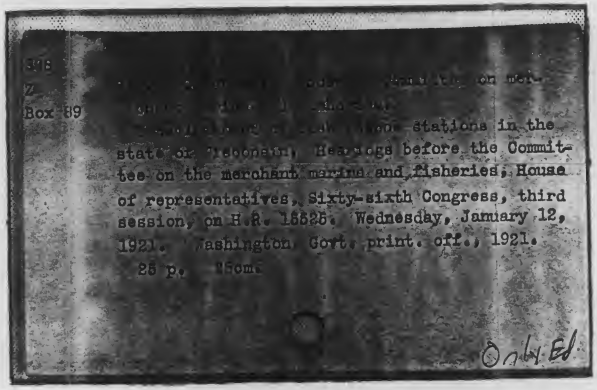

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ESTABLISHMENT OF FISH RESCUE STATIONS IN THE STATE OF WISCONSIN

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HEARINGS

BEFORE THE

COMMITTEE ON THE MERCHANT MARINE AND FISHERIES

HOUSE OF REPRESENTATIVES

SIXTY-SIXTH CONGRESS

THIRD SESSION

ON

H. R. 15525

WEDNESDAY, JANUARY 12, 1921

WASHINGTON
GOVERNMENT PRINTING OFFICE
1921

COMMITTEE ON THE MERCHANT MARINE AND FISHERIES.

HOUSE OF REPRESENTATIVES.

SIXTY-SIXTH CONGRESS.

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ESTABLISHMENT OF FISH RESCUE STATION IN THE STATE OF WISCONSIN.

COMMITTEE ON THE MERCHANT MARINE AND FISHERIES,
HOUSE OF REPRESENTATIVES,
Wednesday, January 12, 1921.

The committee met at 10.30 o'clock a. m., Hon. William S. Greene (chairman) presiding.

The CHAIRMAN. We will take up H. R. 15525 and will hear from Representative Esch first.

The bill is as follows:

[H. R. 15525, Sixty-sixth Congress, third session.]

A BILL To provide for the establishment on the Mississippi River, in the State of Wisconsin, of a fish-rescue station, to be under the direction of the Bureau of Fisheries of the Department of Commerce.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there shall be established on the Mississippi River, in the State of Wisconsin, a station for the rescue of fishes and the propagation of mussels in connection with fish-rescue operations, to be under the direction of the Bureau of Fisheries of the Department of Commerce, at a point to be selected by the Secretary of Commerce, and for this purpose there is authorized to be appropriated the sum of $75,000 for the construction of buildings and the purchase of equipment, boats, and such other accessories as may be deemed necessary for the successful operation of such station.

SEC. 2. That in connection with the establishment of such fish-rescue station there is authorized the following personnel, namely: One district supervisor at $3,000, to have general charge of fish-rescue and fish-cultural operations in the Mississippi Valley; a field superintendent at $2,400; two field foremen at $1,800; five fish-culturists at large at $1,400 each; one engineer at large at $1,400; one clerk at $1,200; two coxswains at large at $1,200 each; and two apprentice fish-culturists at $1,800 each.

STATEMENT OF HON. JOHN J. ESCH, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF WISCONSIN.

Mr. ESCH. Mr. Chairman and gentlemen, this bill is to provide for the establishment on the Mississippi River, in the State of Wisconsin, of a fish-rescue station, to be under the direction of the Bureau of Fisheries, Department of Commerce.

The fish-rescue work is something of a departure in connection with the work of the Bureau of Fisheries, although it began something like 18 or 20 years ago, so far as the upper Mississippi River is concerned, under the direction of R. S. Johnson, who, at that time, was an official in the Bureau of Fisheries. He conceived the notion that much beneficial work could be done by rescuing fish in the landlocked waters of the upper river upon the subsidence of the river, beginning with the midsummer months and continuing until

the freeze-up; but he had small equipment and had very small appropriations, so that the work was practically tentative for quite a number of years. In 1914, however, the fish rescued in the upper river amounted to about 2,500,000, and from that year on there has been a very marked increase in the amount of fish rescued.

Rescue work, so far as is concerned in this bill, means the seining of landlocked puddles, pools, bayous, lakes, ponds, and so on, in the upper river, and transporting the fish thus seined out of the pools, lakes, bayous, etc., to the main channel. The reason for this is simple. The Mississippi River, in its upper reaches, fluctuates from 12 to 15 feet and there are vast bottom lands, the valley of the upper river being from 200 to 500 miles in width, traversed by numerous cross streams or bayous and lagoons in which the fish propagate.

The water in the upper river begins to subside about midsummer after the June rise, and remains low practically throughout the balance of the year. As the water recedes there are many lakes, pools, and puddles created, and the fish that have been bred therein are landlocked, can not escape, and so, in many, many instances, perish. They perish, first, because the pool itself may become absolutely dry or become so shallow that there is not sufficient food therein to preserve life; secondly, they perish because, if they happen to survive until winter comes, the ice forming over them absolutely destroys them, because the ice in the upper river sometimes reaches a thickness of 30 inches, and the pool being frozen over there is no air and they suffocate. In fact, there are many cases in which the pools freeze absolutely solid. Rescue work, therefore, means the saving of these fish in these landlocked pools, lakes, and bayous and putting them back in the main stream.

Mr. CHINDBLOM. It is one of the few cases, Congressman, where nature does not seem to provide for itself.

Mr. ESCH. It does not, and therefore man, with his intelligence, must come in to save the fish. The work has grown to such a rapid extent that it is necessary to have a station established from which all operations in the upper river would be conducted. The bill provides such a station—building the structures, providing the necessary water equipment, and providing for the necessary personnel.

I do not know that I can give you a better idea of the necessity, character, and value of this work than to give you my experience one day the middle of September last. I was invited by Supt. Collier, who has charge of the upper river rescue work, to accompany him to the field of operations near Lynxville, Wis., 40 miles below La Crosse, my home town. We reached the station at Lynxville early in the morning and in a launch went to a landlocked sluice which was to be seined that day by two crews consisting of five men each, each with a foreman. That sluice was one-third of a mile from the river bank, 1,500 feet long, and an average of 150 feet wide. The crews started with a seine about 150 feet long at, say, the lower end of this lake, and dragged the net up to the center. The net consisted, I think, of an 8-inch mesh, the top cord being buoyed with cork buoys to float it and the lower cord being fitted with leaden weights to keep it on the bottom. As the crews at each end of the net, walking along the banks, drew the net toward the center, all the fish were gradually driven ahead of the net. When that net had been dragged out four

or five hundred feet toward the center of the lake it was staked and made fast, so that no fish could get below it. Then the crew took another net of about the same length and about 150 feet long, and starting at the upper end of the lake and dragging toward the center. When they got to the center they wove together the two ends of the net, leaving the other two ends disengaged. That made an area of water something like 100 feet in diameter surrounded by the net. The men began pulling in the net, constricting the diameter gradually.

As they did that, they utilized the open the disengaged ends of the nets in making a runway in the middle and opening into clear water, something like 50 feet in length and with the distance of the nets 3 or 4 feet apart. When the diameter of the net had gotten down to 50 feet we noticed considerable agitation upon the surface of the water. In some cases the larger fish jumped out, evidently much agitated, and a few leaped over the cork edge of the net and escaped—a very few. When the diameter had gotten down to about 25 feet, the surface was almost in full agitation, there was such a mass of fish. The men got out at the outside of this circle and gradually pushed the net in toward the entrance to the runway, and the fish finally were all driven into the runway. Then the men took tubs and with dip-nets lifted the fish into the tubs, and as the tubs were filled they were carried about a third of a mile and dumped into the main river. In that small pool or lake in that one day these 12 men took out 98 tubs of fish, aggregating 560,000 buffaloes, rough fish and game fish; there were literally thousands of black bass, pike, bull heads, catfish, and crappies, and then of rough fish, such as carp.

That is an illustration of the way in which this rescue work is carried on. That was a banner day, I admit it, but the average last year of a single crew was 110,000 fish rescued a day.

To give you some idea of the importance of this work, as I stated, in 1914 there were about two and a half million rescued. In 1918 they had rescued 34,000,000, in 1919 they rescued 157,000,000, and in this last season, owing to the fact that it was shorter and owing to the fact the wages of the men were higher, they rescued 116,750,000. I do not know that we can comprehend what that means. The pond fishes that are propagated in the 140 hatcheries of the United States, according to a statement I have given me by Mr. Leach, aggregated only 1,800,000. So you have in this rescue work many, many more times the amount of game fish rescued than are propagated artificially in the Government hatcheries.

Now, as to the cost. Mr. Leach, in a letter to me of January 14, states as follows:

> In reply to your question some time ago, regarding the cost of producing fish at the bureau's stations, you are advised that during the calendar year 1919 1,800,000 pond fishes were produced at the various stations operated by the bureau. Their approximate cost per thousand was $4.42 for fingerlings No. 2½.

What does that mean?

Mr. LEACH. That means 2½ inches in length.

Mr. ESCH (continuing):

> You will therefore readily see that the 156,388,000 fish rescued during the past season by the bureau at a cost of 20 cents per thousand furnishes a good illustration of the great value of the work.

Mr. RANDALL. And the cost last year was higher than the year before, was it not?

Mr. ESCH. Yes. The cost last year was about 21.7 cents per thousand, while the year before, 1919, the cost was approximately 20 cents. I think, gentlemen, that you can not put Government money to more valuable use in the matter of conservation and food production than in this rescue work on the Mississippi River. It can not be done.

Now, as to the value. In 1918, the rough fish, that would be the carp and buffalo, amounted to 2,500,000 pounds, aggregating enough to make 400 carloads. They were shipped to the eastern markets, the chief market being New York, and the amount received therefor was $250,000. This gives you some idea of the commercial side of this remarkable work, not saying anything about the side of the angler.

In a letter sent to me by Commissioner Smith, under date of January 18, 1920, he states:

During the season recently closed—

That would be the season of 1919—

156,338,000 food fishes from 1½ to 4 inches long, representing practically all the commercial species handled in the markets of the Middle West, were removed by the bureau from shallow landlocked pools along the Mississippi River, and all but 820,140 of them were immediately returned to the main river. Of the comparatively small number distributed, only 10 per cent were shipped to distant points. The remainder were delivered to applicants, who planted them in waters connected with the Mississippi watershed.

As is probably well known to you, all the fishes thus salvaged would necessarily have perished and have been entirely wasted when the temporary pools formed at the time of freshet became dry or frozen.

Judging from the results obtained at the bureau's hatcheries, where the losses on fish carried to the fingerling stage do not exceed 50 per cent, it is estimated that at least 25 per cent of the number of fish salvaged in the 1919 operations will reach the markets within two to three years and that the average weight at that time for all species will not be less than 1½ pounds. Figured on the average cost per pound paid by commercial dealers in the upper Mississippi Valley during December, 1919, the fish salvaged by the bureau during that year will be worth $6,527,000 in two or three years' time—

Which is practically more than the whole Bureau of Fisheries cost this Government.

Mr. WHITE. There has been introduced into the House and referred to this committee and by this committee to a subcommittee on fisheries, a great many bills providing for fish-cultural stations and work of that nature. Offhand, I should guess there are 50 or 75 of them that are sleeping in the subcommittee, calling for an aggregate of a good many millions of dollars. The subcommittee has not acted, I think, largely because we got a pretty plain intimation from some authority in the House that they could not look with favor on any such demand for money at this time. I take it you have drawn—and I want to get it into my head—you draw a distinction between fish-cultural stations, as they ordinarily designate them, and this rescue work?

Mr. ESCH. Absolutely.

Mr. WHITE. And there is no suggestion of a fish-cultural plant in connection with this proposal of yours?

Mr. ESCH. Not at all; solely rescue work.

Mr. WHITE. This is purely a rescue proposition, and we can distinguish between that and this mass of other bills?

Mr. ESCH. I think you can very readily make a distinction. And I call another point to your attention which might justify favorable action on this bill, in that it also provides for the propagation of mussels in connection with the rescue operations.

Mr. CHINDBLOM. Before you go to that subject—it may be this question would more properly be put to some representative of the bureau—are there other rescue stations of this kind in the country?

Mr. ESCH. There are no rescue stations in the United States. This work is not confined to the upper river, but in the winter months Mr. Collier and his assistants go to the Louisiana waters, as Dr. Lazero knows, to do rescue work in the lower regions of the Mississippi.

Mr. CHINDBLOM. And there are no stations anywhere?

Mr. ESCH. There are no stations anywhere; this is the only one. And I will say the great field for rescue work extends from Prescott, Minn., which is about 25 miles below St. Paul, to Sabula, Iowa, a stretch of approximately 300 miles. The opportunities for rescue work in that 300 miles are simply magnificent. Here these millions and millions of food fishes have been going to waste year after year until this rescue work started, and we can only scratch, as I might say, a part of the ground; we can not begin to cover the territory because of the limited appropriation and limited facilities.

The CHAIRMAN. Is this rescue work carried on by private enterprise or by the Government?

Mr. ESCH. Oh, the Government has charge of the whole matter.

Mr. WHITE. What are the several States in that neighborhood doing, if anything, in connection with this work?

Mr. ESCH. At first there was very marked hostility to the operations of the Government in this rescue work. Now they are heartily cooperating and giving and surrendering the right of rescue work. That is their own territory, and at one time they practically almost forbade the Government's rescuing fish.

Mr. WHITE. You say they are surrendering; are they contributing?

Mr. ESCH. They have, but I think the director can advise you more clearly as to that. I know at one time Supt. Nevins, of our conservation commission of Wisconsin, attempted to secure some pike and bass for distribution in the inner waters of our State, and it was very simply stated that it was not primarily designed for rescue.

Now, in connection with the propagation of mussels, which differentiates this bill from any fish-cultural bill and which, in my judgment, would alone justify its enactment, let me say some 15 or 16 years ago Profs. La Favre and Johnson, of the University of Missouri, made experiments as to artificial propagation of fresh-water mussels, and they made some of those experiments in a little wooden station in my own home city. I therefore had the opportunity of seeing a demonstration. They showed that a fresh-water mussel propagates in different months of the year; that the eggs of the ripe mussel can be expressed or taken from the mussel, put in a tank of water, and then, if fish are placed in the tank, those mussel eggs or glochidium—that is the technical term—fasten themselves upon the gills, fins, and tails of the fish in the tank and there they follow a parasitic life of from four to five or six weeks to two months, when they are sloughed off and drop on the bottom of the stream and are ready to start their independent existence.

Now, we want, in connection with the fish-rescue work, to have fish culturalists in every rescue crew supplied with the right kind of mussels, so that as the tubs are taken from the landlocked pools and before being dumped into the main channel, the fish culturalists would place in each tub a certain number of glochidium, and by the time the tub reaches the main bank the fish will have been impregnated with the glochidium and it is all done in the one process. So that we will be distributing the mussel all up and down the river and we can, therefore, propagate the mussel, which is much suited for propagation, for the production of pearl buttons. And Mr. Hull is here, in whose district are a large number of button factories, in the upper river, where it is a large industry, and one which, unless we produce a large supply of these mussels, will have to go out of business, involving many thousands of employees.

Mr. DAVIS. Will the distribution of these mussels be universal: in other words, would they be distributed in such a way that they would be available in deeper waters?

Mr. ESCH. They are put right into the river——

Mr. DAVIS. I understand that.

Mr. ESCH. The fish is impregnated and then the fish goes where he wills and each fish seeks its own spawning place and season. We do not know where they go, but we find they can be artificially propagated and the work is successful. The Government has already recognized the value of the mussel production by establishing a hatchery at Fair Port, Iowa. I think it was established some 10 or 20 years ago.

Mr. DAVIS. What I meant was this, Mr. Esch: It is not valuable from a commercial standpoint except where those mussels are in comparatively shallow water. In other words, they can not be gathered in any other way, can they?

Mr. ESCH. Oh, they fish for the mussels in the upper river practically in the main channels.

Mr. DAVIS. With a form of dredge?

Mr. ESCH. They have rakes on which are numerous hooks, and these are dropped to the bottom of the river and dragged along on the bottom, and as the hook comes in contact with the mussel it grabs hold of it and is pulled up; it don't know enough to let go.

Mr. CHINDBLOM. Maybe somebody else can answer this question more readily, but what do we know about the migration of these particular kinds of fish you have up there in the landlocked waters? Will they travel very far?

Mr. ESCH. I judge so, because the conditions are practically the same for hundreds of miles along the river; but I would prefer to have you ask the question of Mr. Leach or Director Smith. I think it ought to be realized that here is a chance for doing, with a small amount of money, an enormous amount of good, because fish are the cheapest form of meat food.

STATEMENT OF DR. HUGH M. SMITH, COMMISSIONER OF FISHERIES.

Dr. SMITH. I would like to concur in everything that Mr. Esch has said about the nature and importance of this work, and in answer to the question of Mr. Chindblom a moment ago I will say practically all of the fishes involved in these operations are more or less migratory, so that when rescued fish in Wisconsin are returned to the main stream, those fish may be caught for the market in Missouri or Illinois or Iowa or farther south. And when you innoculate such fish with the young mussels the fish will distribute those mussels all over the length of the Mississippi Valley. So that this really is not State work; it is work which is interstate and very properly falls to the charge of the Federal Government. Work done anywhere in the Mississippi Valley at any point may benefit all the States in the Mississippi Valley.

Mr. LAZARO. Dr. Smith, Mr. Esch a while ago spoke of some rescue work being done in Louisiana. Would you mind telling us what kind of work is done there and just how much work?

Dr. SMITH. That is a field that has not been properly developed because we have not had the facilities, but Louisiana undoubtedly offers fine opportunities for the rescue of some of the most valuable food fishes—black bass, and particularly buffalofish and catfish.

Mr. CHINDBLOM. I suppose the headwaters of all the big streams in the country would furnish opportunity for this kind of a station, would they not?

Dr. SMITH. The opportunity is particularly marked in the Mississippi and its tributaries, but we could very properly extend the work into the Missouri and the Ohio and various other of the major tributaries.

Mr. DAVIS. How about the Cumberland and the Tennessee?

Dr. SMITH. If those rivers are subject to freshet and leave the fishes stranded in the farm lands, as on the Mississippi, then there is certainly a field and somebody ought to go in and do the work, because this is a form of fish conservation which for immediate results has no equal. We are operating many fish hatcheries, as Mr. Esch has pointed out, but if we had 350 hatcheries handling the same kind of fish we are rescuing we could not have exceeded by artificial means what we did in the rescue operations in 1919. It is an actual fact that 345 hatcheries would have been required to produce the fish that were saved from certain destruction by this fish-rescue work in 1919, and this work is done at a cost that is insignificant. About 80 per cent of the fish we rescued in 1919 were salvaged at a cost of 13 cents per thousand, all overhead charges included.

Mr. Chairman, I prepared a popular article on this subject last year, thinking it would appeal to many people in various parts of the country, and, with your permission, I would like to pass copies of this reprint among the members of the committee.

The CHAIRMAN. I recollect a number of years ago we had quite extensive hearings in regard to the mussel business.

Dr. SMITH. Yes.

Mr. RANDALL. Ought the contents of this article not appear as a part of our hearing?

The CHAIRMAN. I think it might be a very good idea.

Mr. ESCH. You could not put in the illustrations, I suppose, without authority of the House; but the text could be put in.

Mr. CHINDBLOM. I guess we could put in the illustrations if Dr. Smith can furnish the plates.

Dr. SMITH. Yes; we have the photographs. The mussel industry, to which reference has been made and which represents an annual

value of a great many million dollars, with the dependent pearl-button business, is absolutely dependent on the presence and abundance of these fishes which we are rescuing, because it has been established that the different sorts of mussels which are made into pearl buttons must attach themselves to particular fishes in order to pass through the early stages of their existence.

Mr. CHINDBLOM. They fasten themselves to certain fishes?

Dr. SMITH. They have a predilection for certain fishes, and if those fishes are not there these mussels will not grow or survive. So that some of the most valuable mussels, like the thick white-nacred form popularly known as the "niggerhead" and having no other common name is dependent upon the presence and abundance of a kind of fresh-water herring, which does not exist in great numbers but which has been salvaged in very considerable quantities, comparatively speaking. If those fish are not saved that particular sort of mussels is doomed to extinction, and these gentlemen connected with the button industry can say how serious a matter that would be.

Mr. FICKETT. It would put us out of business.

Mr. RANDALL. These fish salvaged here are the kind of fishes that the germs, or what they call the glochidia, have a predilection for?

Dr. SMITH. Yes; because, as a matter of fact, we salvage every kind of fish in the Mississippi Valley.

Mr. WHITE. I wish you would put into the record a simple explanation of the process of propagation of these mussels and what part the fish play in it.

Dr. SMITH. These mussels, of which there are scores of species in the Mississippi River and its tributaries, produce an enormous number of young, which are thrown off in microscopic form in clouds. Unless the fish are present when these young mussels are swimming freely in the water the mussels will perish. They will fall to the bottom before they have attained a stage of development that fits them for the bottom life. So it is absolutely essential these fish be made available to them either by natural or artificial means—fishes to whose gills they can attach themselves. These young mussels, which have the power of movement, attach themselves immediately to the gills of suitable fishes, and it is a part of our work in connection with rescue operations, and it is a part of the functions of our station at Fairport, Iowa, to inoculate suitable fishes with these mussels. And we are doing that work on a very extensive scale.

Mr. WHITE. They attach themselves to the gills of fishes and survive until such stage of their development is attained that they can drop off and go to the bottom and live?

Dr. SMITH. That is the idea. They do not harm the fishes; they seem to set up a little irritation in the gill filaments, and quickly embed themselves in the soft tissues of the gills and pass part of their existence there, extending from a few weeks to several months, depending on the kind of mussel. They then fall to the bottom and are able to look after themselves.

The button manufacturers are very much interested in this work and during the past season, when we found we were not covering the territory as properly and adequately as we should, they themselves provided the men to go along with our seining crews to assist in the operations and inoculate the fishes with the mussel spawn that

was present in enormous quantities in all of the rescue centers. And that work, in which the pearl-button manufacturers cooperated during the past season, in October and November and probably into December, resulted in the salvage of 5,841,000 of the food and game fishes of the Mississippi and we estimate that nearly 500,000,000 young mussels were inoculated on those fishes and started on their independent career.

The CHAIRMAN. How do you dispose of those fishes: are they sold to the market?

Dr. SMITH. These fishes are immediately planted in the Mississippi because they are young; they are fishes that have come into existence during the period of high water, which usually comes at a time when a majority of the fishes in the river are in a spawning condition, and when the water subsides the eggs and the young are left behind. Most of the old fish are able to find their way back to the main channels, but these helpless young are left behind and they are the ones that we rescue, and by the time our crews reach these landlocked waters the young have attained an average length of several inches.

We regard this work as of very great importance, because of the enormous quantities of food fish we can save from certain destruction. I may say we have never had proper recognition from Congress for this work and never had a special appropriation for it. We have been carrying on the work because it seemed to be an obvious duty, and we have been paying for it out of our general appropriations and conducting it under our general authority. We would be very glad if Congress would indicate its appreciation of its importance and give us specific authority to carry it on, as provided in this bill.

Mr. WHITE. How much money have you been spending in work of this nature heretofore?

Dr. SMITH. The amount we expended in 1919, when we reached the high-water mark and rescued nearly 157,000,000 fishes, was about $30,000, was it not, Mr. Leach?

Mr. LEACH. Yes, sir.

Dr. SMITH. That was taken from our general propagation fund.

The CHAIRMAN. You propose here to recommend an appropriation of $75,000?

Dr. SMITH. Yes, sir; because we have not begun to cover all the available territory.

Mr. CHINDBLOM. I observe that the $75,000 recommended here is for the construction of buildings and for the purchase of equipment, boats and accessories.

Mr. ESCH. And the personnel.

Mr. CHINDBLOM. And the payment of salaries of the personnel.

Mr. ESCH. That would be a permanent proposition.

Mr. CHINDBLOM. That would be a separate appropriation, would it not?

Mr. ESCH. Yes.

Mr. CHINDBLOM. But the $75,000 is intended for buildings and equipment?

Mr. ESCH. Yes.

Mr. CHINDBLOM. That need not be an annual appropriation?

Mr. ESCH. Oh, no.

Dr. SMITH. Once made, it would not be necessary to renew it.

Mr. CHINDBLOM. But of course the appropriation requested for the personnel would become an annual appropriation?

Mr. ESCH. Yes.

Mr. CHINDBLOM. And the total of that is how much, Dr. Smith? $14,200. I make it—about $15,000 per annum.

Mr. ESCH. You might state, Doctor, what would be put into the permanent structure.

Dr. SMITH. We would need some buildings and facilities for holding the fish while they are being inoculated with the mussels and while they are being hardened preparatory to shipment to distant parts of the river. We need vessels; we want to equip a number of new crews with the vessels and launches and with house-boats for the holding of the men and their equipment while the actual operations are going on.

Mr. WHITE. I do not ask this question as indicating any hostility of my own to this proposal, but if we recommend this appropriation, is there an unlimited field for this kind of work, or would it properly be confined to those few streams running through land of this general character, where you have this large rise and rapid recession of waters?

Dr. SMITH. The greatest need for this kind of work is in the Upper Mississippi.

Mr. WHITE. And we are not establishing a precedent that would carry us to every other stream in this country, but only to the streams of this particular character where there is this rapid rise and sudden fall of water?

Dr. SMITH. That is the case. And with the facilities that would be provided by the proposed appropriation for equipment and personnel we would be able to care for all the apparent needs throughout the Mississippi River and its major tributaries.

Mr. WHITE. This personnel could operate not only in the winter months, but, when there would be no possibility to do rescue work in the upper river, they could go elsewhere?

Dr. SMITH. That is what we have in mind.

Mr. WHITE. So that they will have a continuous line of work?

Mr. SMITH. While the rescue work, as now conducted in the upper half of the Mississippi covers only about six months, it is possible to do that work throughout most of the year by entering at present unoccupied fields.

Mr. WHITE. And there is a limit to the fields, we can properly say?

Dr. SMITH. There is a limit, the available fields as we now recognize them would be covered by such a bill as this.

Mr. LAZARO. Mr. White, a while ago, spoke of a number of bills for fish hatcheries that had been approved by your bureau, but that had not been enacted into law because of the hard times and the seeming unwillingness of Congress to appropriate the money. Do you not think it would be good economy for Congress to appropriate money not only for a measure of this kind, to rescue fish, but to carry these bills through and establish these stations, on account of meat being so high all over the country, and fish being a good food and a cheap food and a healthy food?

Dr. SMITH. We would be much pleased to see additional fish hatcheries established in various parts of the country. I am not so sure this is the opportune time, however, because of the greatly increased cost of construction. In early times, when we got most of the hatcheries we now have, the lands and the buildings and the ponds could be provided for from twenty to twenty-five thousand dollars. In more recent years we have found at least $50,000 is required for that purpose. And I am not prepared to say that $75,000 would be adequate with the present condition of the labor and materials markets.

Mr. LAZARO. But in cases where the States, for instance, would be willing to contribute——

Dr. SMITH. I believe there is no authority by which a State can assist in the construction of a Federal building. That would give the State a hold which Congress might not be willing to permit.

Mr. LAZARO. If my memory serves me right, I think in our State our legislature has given the conservation commission authority.

Dr. SMITH. In your State, we have established a field station for hatching one of your most valuable food fishes and we have been doing most excellent work there in cooperation with your State conservation commission.

Mr. LAZARO. You remember that when the legislature gave them the authority?

Dr. SMITH. Yes.

Mr. LAZARO. And the State is cooperating; is not that true?

Dr. SMITH. Yes, sir. We cooperate with the States everywhere, and our own effectiveness and the value of the State work is greatly increased as a consequence; but this particular station to which Dr. Lazaro refers is one we regard as a field station. It has no permanent equipment, can be moved from place to place, and has not personnel except what we detail from other stations.

Mr. DAVIS. Of course we all realize the increased cost of construction under present conditions; but, generally speaking, would it not be a matter of economy to have more widely distributed hatcheries, on account of the cost of transportation for long distances and also the loss of life of the young fish where they are carried too far?

Dr. SMITH. I think as a general proposition, sir, there ought to be additional hatcheries because of the various points which you make. We have to distribute the hatchery output over very long distances now, in order to meet the demand, and railroad transportation for our young fishes has increased about 100 per cent in cost during the last few years.

Mr. ESCH. You have your own cars?

Dr. SMITH. We have our own cars, but the cost of transportation has practically been doubled since 1914.

The CHAIRMAN. I have a letter from the Department of Commerce explaining their interest in this bill which I will put in the hearing.

(The letter referred to is as follows:)

DEPARTMENT OF COMMERCE,
Washington, January 11, 1921.

MY DEAR CONGRESSMAN: In reply to your letter of January 8, asking for a report on H. R. 15525, to provide for the establishment on the Mississippi River, in the State of Wisconsin, of a fish-rescue station, I beg to advise that a full

consideration of the conditions would indicate the need for such a station. As a conservation project it stands foremost on account of the great number of food fishes that may be saved and placed in waters where they will be of ultimate value to the public. By the conservation of this natural resource the food supply of the Mississippi Valley will be greatly augmented.

Through the establishment of such a station, rescue operations can be more economically conducted than at the present time, thus resulting in the saving of public funds. As now conducted the personnel for the rescue work is drawn from four separate and distinct permanent stations, and it is therefore not as efficient nor as well trained as would be the case were a personnel especially provided for the purpose. The importance of the work as a means of increasing the food supply of the country can hardly be equaled in any other manner, cost, results, and quick returns being considered.

The Commissioner of Fisheries advises me that in his opinion the appropriation specified in this bill will be ample for the purpose, and that the bureau's output of the commercial fishes of the Mississippi Valley can be increased from 100 to 200 per cent through the agencies authorized by the bill.

For the purpose of broadening the bill and making it of more general interest, it is suggested that in line 6, after the word "operations," there be inserted the following: "Throughout the Mississippi Valley."

Sincerely, yours,

J. W. ALEXANDER.
Secretary of Commerce.

HON. WILLIAM S. GREENE.
Chairman Committee on the Merchant Marine and Fisheries,
House of Representatives.

Dr. SMITH. Mr. Leach, who is in charge of our fish-cultural work and is personally familiar with conditions on the upper Mississippi, is here and would be glad to answer any questions that might be asked as to the details of this work.

STATEMENT OF MR. G. C. LEACH, IN CHARGE OF THE DIVISION OF FISH CULTURE, BUREAU OF FISHERIES.

Mr. LEACH. I believe the committee can better follow my remarks by referring to a map I have here. The places indicated with the black cross marks represent the points where we are at present doing rescue work. Those in red show the possibilities of the field, commencing with Prescott, Minn., and extending down into Louisiana. You will notice in practically every State there are lowlands along the Mississippi River which overflow every spring and in which the fish go in large numbers to deposit their spawn. After spawning the waters usually recede and the old fish, following their natural instincts, seek the main river and leave their eggs and possibly some of the young fish, too small to follow them, in the landlocked pools.

Mr. WHITE. When do the fish usually spawn?

Mr. LEACH. The fish usually spawn in May and June in the upper reaches of the river and in April and May in the lower sections, down in Mississippi, Arkansas, and Louisiana. There is a large territory in the States of Illinois, Kentucky, and Mississippi, and there is a very large territory in the vicinity of La Crosse.

Mr. WHITE. When do the fish spawn up in the northern regions?

Mr. LEACH. The fish spawn in the upper river—Minnesota, Wisconsin, Iowa, and Illinois—in May and June.

Mr. CHINDBLOM. There is considerable room for this work in the Illinois River?

Mr. LEACH. Yes; there is a lot of room for it in the Illinois River.

Mr. CHINDBLOM. Incidentally, I think, the Illinois River produces the largest number of fish in the world.

Mr. LEACH. The catch is possibly 70 per cent carp and similar rough fish, the remainder being bass and catfish. From Meredosia, Ill., for a distance of about 40 miles each way there is a section that is entirely flooded during the overflow stages in the spring. Numerous small pools, bayous, and lakes are formed, in which the fish seek spawning grounds.

Mr. WHITE. Are all these fish you have mentioned food fish?

Mr. LEACH. Practically every one of them; some few nonedible fish, like gars and dogfish are taken, but not many.

Mr. WHITE. Those that are not food fish are destroyed?

Mr. LEACH. We do not enumerate any except food fish in our list of fish rescued. The nonedible fish are either destroyed or utilized for fertilizers.

Mr. RANDALL. May I ask right here why you ship and sell what you call rough fish?

Mr. LEACH. The carp and buffalo?

Mr. RANDALL. Yes.

Mr. LEACH. The bureau does not sell any species of fish. However, commercial fishermen sell large quantities of carp and buffalo fish on the eastern markets. Carp are sold mostly alive in New York City. Large amounts of carp and buffalo fish are sold in the mining districts and other places where a cheap class of fish food is highly desirable. In the bureau's rescue operations 99 per cent of the fish saved are from 1 to 3 inches in length.

Mr. CHINDBLOOM. There is a large demand for carp and buffalo in Boston.

Dr. SMITH. You do not get the idea, sir, that we are shipping and selling those fish; that the Government is doing that?

Mr. RANDALL. My understanding was that part of the fish recaptured were shipped to market.

Dr. SMITH. About one-tenth of 1 per cent of the number which we rescue are sent into the surrounding States for stocking the local waters, but they are not sold. They are young fish furnished gratis for stocking purposes and are not suitable for food. But there is a very large business in commercial fishing in this whole region.

Mr. LEACH. Under the present arrangement, we draw our personnel from the Homer (Minn.) station, the Manchester (Iowa) station, and the Louisville station. These men must handle the rescue work, and this means that the output of their home stations is more or less curtailed. It means we must also take from the funds for the regularly established fish-cultural stations the money with which to conduct the operations. What we require is a permanent rescue personnel to take care of that work, leaving the present personnel to man the stations and handle their fish-cultural duties. Until we have a regularly established personnel for this fish-rescue work, men trained and efficient, who understand all this territory here and know where to seek the pools which dry up first, we are always going to be handicapped. We can not use new men in that field, because they have to know which pools dry up first and where they are to be found.

Mr. WHITE. Are the physical conditions such, as a general proposition, that you can do your rescue work in Louisiana without neglecting it up here in Wisconsin and Minnesota, or vice versa?

Mr. LEACH. I might explain that by saying that our operations start in the upper reaches of the river, at Prescott, Minn., along in July, and continue until December. What we call the upper river is that section from Prescott, Minn., down as far as Cairo, Ill.

At the close of the work in December the equipment is stored and left at one of the main stations.

Along in January, February, and March our crews are down in Louisiana and that section of the river. Down there they rescue the more valuable commercial species, such as the buffalo fish. Before we undertook that work the eggs of the buffalo fish were sent to market and lost. Last year we were instrumental in distributing something like 110,000,000 buffalo-fish fry; and if our men had not undertaken the operations all of those fish would have been lost. The operations can extend northward from Louisiana to the mouth of the Ohio River, where the work would be undertaken in June, and in the Illinois River it could be undertaken some time in May. There is a peculiar situation in regard to the Illinois River. It overflows the dikes in the spring, and then the companies up there interested in land undertake to pump the water back into the main river. That leaves the fish high and dry on the land, or else they have to pass through the pumps, where they are destroyed. We find it advantageous to send men into that field during the season when they are pumping and gather up the fish and put them back in the main river. Some two or three years ago, I believe, we rescued something like four or five hundred thousand fish at one point in just a few days. By working our crews that way they will be busy throughout the year. That is why we wish to make this bill broad enough to include the entire Mississippi Valley. That is the only region where rescue operations can be conducted, and that is the work for which we wish the establishment of certain buildings.

We find it advantageous to distribute some of the fish in the section outlined in red on the map and place them in the upper tributary waters of the Mississippi. I believe better results are obtained in this way than by putting them all back into the main river. It gives the people in that section of the country a chance to get fresh fish for home consumption. Otherwise the fish would have to be shipped in from the Pacific coast, the Great Lakes, or the Atlantic coast. They see no reason why they should not be entitled to fresh fish, and they are continually beseeching us to extend our operations.

Mr. CHINDBLOM. I notice the station in the neighborhood of Cairo would cover operations in the States of Kentucky and Tennessee.

Mr. DAVIS. I do not think that covers Tennessee.

Mr. LEACH. There are great possibilities around the region of Reelfoot Lake and Lower St. Francis River, in Arkansas and throughout southeastern Missouri, in the swamp regions. We have never had sufficient equipment to cover that field. All of our equipment has been purchased through our funds appropriated for fish-cultural work.

Mr. ESCH. You might explain how you connect up the large work of mussel propagation with the rescue work.

Dr. SMITH. Wherever these fishes are being rescued there are likely to be found pearl mussels in spawning condition, and it is the simplest thing in the world to open those mussels in a tub of water, liberate their free-swimming young, and then put fishes into the tubs. They inoculate themselves. By examining their gills from time to time, you can get a very good idea of the intensity of the inoculation, because the young mussels, which are light in color, show up distinctly on the red gills. Then the fish are simply distributed as though they had not been inoculated, and they are serving a very useful double purpose in that way.

Mr. ESCH. And your experience as to the number of glochidia that a given size of fish can carry you might explain that.

Dr. SMITH. Yes; we do not overimpregnate the young fish, but do the work judiciously. The number we put on an adult fish at the special station at Fairport, on the Mississippi River, averages about 2,000 to 3,000. The fish are selected with reference to the particular mussels whose young we have available.

Mr. CHINDBLOM. How large a fish would that be that would carry 3,000—a foot long?

Dr. SMITH. Yes. A black bass of a couple of pounds could carry 2,500 or 3,000 young mussels without any inconvenience. There is no evidence that this inoculating does them any harm. There is a little irritation obviously set up, because the young soon become embedded in mucus, but as soon as they fall off the gills become normal.

Mr. ESCH. I noticed in one of your folders the result of the experiments you carried on at Lake Pepin. You impregnated a given size pike with 3,000 glochidia. They were put in on the 19th day of August and they were sloughed off about the 1st day of May; and of the 3,000 that were impregnated on a given fish, 883 were dropped off as clams, showing a production of 27 and a fraction per cent.

Dr. SMITH. One of the most valuable mussel shells abounds in that particular section and it was that species which we, in cooperation with the button manufacturers, inoculated on some 5,000,000 rescued fish last fall. About 500,000,000 young mussels were put on those rescued fish in the short season of 1920.

The CHAIRMAN. What do you do with these young mussels; do you dispose of them?

Dr. SMITH. They are inoculated on the fishes, the fishes are liberated, and at a certain stage the mussels drop off and go to the bottom of the river to begin their independent existence, and then are taken out in a few years and made into buttons.

The CHAIRMAN. You have nothing to do with that part of it?

Dr. SMITH. We have nothing to do with that part of it, although, as a matter of fact, we have reared at the Fairport station these young mussels that have been inoculated on the fishes' gills and we have made buttons from mussels we have grown in this artificial way.

Mr. CHINDBLOM. How long does it take a mussel, ordinarily, to get large enough for commercial purposes?

Dr. SMITH. Four or five years, possibly, is the youngest age at which they attain a marketable size or should be taken for manufacture.

Mr. DAVIS. You do not think this inoculation of the mussels on the gills of the fish retards the growth of the fish during that period?

Dr. SMITH. We have no reason to believe so, sir, because in the state of nature this same thing is going on; only in a state of nature the right kind of fish suitable for given mussels when they are in a spawning condition are not always present. We bring the fish and mussels together and in that way improve on nature.

WHEN THE FATHER OF WATERS GOES ON A RAMPAGE.

AN ACCOUNT OF THE SALVAGING OF FOOD FISHES FROM THE OVERFLOWED LANDS OF THE MISSISSIPPI RIVER.

[By Hugh H. Smith, United States Commissioner of Fisheries.]

One of the most important of the varied functions of the United States Bureau of Fisheries is a mighty effort to undo one of nature's apparent blunders and mitigate the damage done annually to the prospective food supply of the country by a cataclysm involving untold millions of the best fishes in the Mississippi River and its tributaries.

This effort, yielding large practical results and coming at a period when there is most urgent demand for the prevention of waste and the maintenance of resources, must be rated as of great public importance and as worthy of general recognition and support.

The Father of Waters is a serious offender against the host of food and game fishes which populate its turbulent course, and exhibits marked disregard for the welfare of the entire fish tribe. Every year, and several times a year, it overflows its banks, wanders far from its proper haunts, and then subsides, leaving behind temporary pools, ponds, and lakes in which are myriads of young fishes whose destruction is inevitable unless human agency comes to their aid. Inasmuch as these fishes represent a large part of the future adult supply of all the leading species, their rescue and return to the main stream is a matter of the utmost importance.

For many years there has been a realization of this stupendous annual waste of food fishes, and steps have been taken to repair some of that waste. It was only recently, however, that the efforts bore an adequate ratio to the magnitude of the task, and it was not until 1919 that the operations assumed a scope and yielded results that could be regarded as fairly commensurate with the need.

The annual freshet in the Mississippi River of greatest importance to the fisheries is the one known as the "June rise," which usually occurs about the time when most of the river fishes are ready to spawn. It is somewhat later than the freshet caused by the melting snows, but is usually of equal volume and represents surplus rainfall that is seeking a southern outlet.

PREHISTORIC GLACIERS CUT A WIDE VALLEY.

In prehistoric times great glaciers, moving down from the north, seem to have cut a wide, deep valley through the upper reaches of the river, and through this passage frequent floods have for ages brought down and deposited silt and drift in such quantities that the main channel has been crowded from the center toward one of the precipitous banks on either side, while the remainder of what formerly constituted the river bed is now a low tableland, with a gradual ascent toward the hills.

It would appear that at one time the main river flowed unhindered through what is now wooded, lake-covered territory, and that great drifts gradually formed and divided the old bed into land-locked ponds, many parts of it with the lapse of time becoming so completely filled in as to provide secure anchorage for trees and other vegetation.

As the river rises it first submerges the adjacent lowlands, making ponds and lakes on the nearest levels; with its continued rise, lakes are formed at higher levels, and so on until the flood stage has been reached, when depressions are often filled quite remote from the main channel.

Pursuing their natural instincts, the adult fishes at flood time leave the main channel and seek quiet backwaters in which to deposit their eggs. The eggs are laid under conditions that appear to be favorable for their development and for the hatching and growth of the young, and the latter may attain a length of several inches before the freshet begins to subside. With the recession of the flood waters, the adults turn their noses in the direction of safety

and most of them ultimately reach the main stream. The young, however, fail to react promptly to the falling waters, and a very large proportion of them sooner or later are cut off and become permanently landlocked.

The temporary pools, ponds, lakes, and canals left by the subsiding flood waters are of various shapes, sizes, and depths. Some of them become dry in a few days; others may persist for weeks or months, while their water is gradually lost by evaporation and seepage; others, in smaller number, continue until winter, when they soon become solidly frozen.

YOUNG FISHES DOOMED TO DIE.

The larger pools that survive the summer are often rich feeding grounds for the young fish, which grow with such amazing rapidity that many of them may attain a length of 8 to 10 inches by early November.

In any event, the fish contained in the landlocked waters necessarily die. The mortality may ensue quickly, as when a small pool becomes completely dry in a few days, or it may be gradual and long drawn out, as in a pond or lake of some acres area.

The frightful conditions that prevail as the water becomes reduced and the fishes more and more concentrated can well be imagined. The fishes' suffering from lack of water and air is usually aggravated by starvation, by the daily heating of the water by the sun's rays to a point that is almost intolerable and often fatal, by cannibalism, and by wading birds, snakes, turtles, mammals, and other fish-eating creatures from which there is no escape. The pools that persist until winter are so shallow that the fishes are killed by smothering, even if the water does not freeze to the bottom.

HOW THE FISHES ARE RESCUED.

The work of salvaging food fishes is simple, direct, and effective. It consists of netting the fishes from their unfavorable environment and depositing them in the open water of the Mississippi, and is accomplished by properly equipped rescue parties dispatched to the flooded districts from conveniently located bases or headquarters.

A Government fish-rescue crew consists of six to eight men, who employ a small launch in going to their field of operations and in returning to their base. The necessary equipment comprises fine-mesh seines of various lengths, small dip nets, galvanized-iron washtubs of 1½ bushels capacity, tin dippers, and a flat-bottom rowboat.

The seining crews begin their work each season as soon as the floods subside sufficiently to disclose conditions. The active operations, as a rule, begin in July and continue in a given section until the allotted task is accomplished or the waters freeze, usually early in December.

The size and depth of given waters determine whether the men shall set their seines by wading or from a boat. As the net is carefully hauled and hunted, the fish are sorted into tubs, then carried as soon as practicable to the nearest point at which open water may be reached and there liberated.

The cut-off waters are for the most part in the bottom lands on both banks, usually within a few hundred yards of the river. In some sections, however, where the surface configuration permits a wide lateral dispersal of the flood waters, the temporary ponds that demand attention may be several miles back. It therefore happens that, while under ordinary circumstances the seining crew can easily carry the tubs of fish to the place of deposit, sometimes teams and motor trucks are employed.

Some of the landlocked waters are veritable lakes in which many seine hauls may be required to secure all or most of the fishes; others are so small that they may be thoroughly fished with a single haul of a short seine; and others are so extensive at the time of the first visit that they may properly be left for future attention when their size shall have become reduced to a point where thorough seining is possible.

ONE HUNDRED AND FIFTY-SIX MILLION SIX HUNDRED AND FIFTY-SEVEN THOUSAND FOOD FISHES WERE RESCUED LAST SEASON.

It may not appear to be a matter of great practical importance to know how many fishes of the different species are saved in the course of a season's work, but it is at least a matter of considerable interest to have such a record for each

of the various sections of the river and for a series of years. Accordingly, the seining parties are under orders to make a count of the number of each species taken from each body of water.

The counting is done at the time the fish are lifted from the seines into the tubs with dip nets. The tubs are half filled with pure water, and fish of given sizes and species are counted into the tubs until the water level rises to a ring 6 inches below the top.

Subsequently, actual counting may not be necessary, but the number may be determined with sufficient accuracy by noting the water displacement. Frequent test countings are made in the course of the season, and a definite ratio of number to bulk is established for each average size of fish and each species.

When the weather is warm or the distance to the planting place is considerable, the welfare of the fishes densely crowded in the tubs requires that the water be kept well aërated. This is accomplished by dipping up a little water at a time and letting it fall back from a height of several feet, and is always aided by the squirming of the mass of fish, which keeps the surface water agitated and often frothy. Under the care of the vigilant and skilled fish men, the mortality among the rescued waifs while in transit is negligible, and when released the fish are healthy and active.

Throughout the entire length of the Mississippi River, except where the banks are protected by levees or where bluffs occur in proximity to the shores, the annual floods leave temporary lakes, ponds, and pools that contain food fishes whose salvage is demanded.

The territory covered by the Government's rescue operations in 1919 extended from Minnesota and Wisconsin to Arkansas and Mississippi. The places that were headquarters for rescue parties were Homer, Minn.; La Crosse, Wis.; Bellevue and North McGregor, Iowa; Quincy and Cairo, Ill.; Clarksville and Canton, Mo.; and Friars Point, Miss.

The record-making efforts in 1919 resulted in the saving of about 156,657,000 food fishes. All parts of the river are not equally productive and all sections were not covered with the same degree of thoroughness. The territory reached from the base stations in Minnesota, Wisconsin, and Iowa yielded by far the largest returns in rescued fishes. There the conditions are especially favorable for an enormous annual destruction, and the need for salvage work is most pressing.

All the major and many of the minor food fishes of the river are represented on the lists of those saved. Predominating in numbers are the staple fishes, which support commercial fishing and contribute largely to the food supply of the region, notably the buffalofishes, carps, catfishes, pikes, crappies, sunfishes, and perches.

Among the rescued game fishes the large-mouth black bass holds an important position, and with it may be classed also the crappies, rock bass, white bass, and various other excellent fishes which, while taken for market, are much sought by anglers throughout the Mississippi Valley.

THE FOOD FISHES SAVED ARE WORTH MILLIONS OF DOLLARS.

The young fishes that are salvaged and replanted in the parent stream are of rapid growth. A few of them may attain marketable size in the year after their rescue, and all of them are likely to be available for human use in two or three years.

The most critical period in the life of fishes is during a few weeks immediately after hatching. For most of the fishes rescued the principal danger from natural enemies and physical catastrophes has passed, the degree of safety depending largely on the size attained.

In the opinion of State and Federal fish culturists familiar with conditions in the Mississippi Valley and experienced in the rearing of the local fishes, at least 25 per cent of the fishes rescued may be expected to survive to a marketable or legal size, and will reach an average weight of not less than 1½ pounds in two or three years. Assuming that all the surviving fishes will then be caught for market and sold by the fishermen at the prices prevailing for the respective species in the local markets in December, 1919, the fishes salvaged by the Bureau in 1919 are estimated to have a prospective value of $6,527,000.

THE COST OF THE WORK IS SURPRISINGLY SMALL.

The fish-rescue work, however beneficial from the standpoint of fish conservation, would hardly be justified if the expense were disproportionate to the value

of the results. It is therefore proper to note that the unit cost is only nominal, and even the total money outlay for operations of the magnitude of those in 1919 is surprisingly small.

Five years ago, when this work was undertaken on a limited scale and involved the salvaging of less than 2,500,000 fishes, the average cost per thousand fish saved was $3.18. In 1919, owing partly to the magnitude of the operations and partly to increased efficiency and better organization, the average cost per thousand was reduced to less than 20 cents. The cost in some of the less productive fields, where fixed overhead charges were applied to a comparatively small output, was somewhat higher, but 75 to 80 per cent of the fish were rescued and replanted at a cost of only 13 cents per thousand.

Throughout the Mississippi Valley—in the States of Minnesota, Iowa, Kentucky, Tennessee, Missouri, Arkansas, and Mississippi—as well as in various other States, there are Federal establishments known as pond-culture stations, at which are reared some of the same fishes that are rescued in the salvage oprations along the river, the principal species handled being the black basses, crappies, sunfishes, and catfishes.

The peculiarity which distinguishes these stations from the ordinary hatcheries is that the ripe eggs are not taken from the fishes by the fish-culturist, as in the case of trout, salmon, whitefish, shad, etc., but the fishes are allowed to spawn naturally.

Most of the pond fishes make nests and guard their eggs and young. It is therefore usually the case at these stations that a relatively large proportion of the progeny of a given pair of fishes is reared to a stage where the young are able to take fairly good care of themselves, although the actual number produced is small.

The results of the operation of pond stations are of interest because of their bearing on the value of the rescue work. It may therefore be noted that the common practice among both Federal and State fish culturists is to distribute pond fishes after they have been reared to a "fingerling" size. A fingerling is less than one year old, and may be from one to six inches long when planted.

The average length of the pond fishes sent out from the nurseries is two to three inches. A Government pond station may produce, rear, and plant from 250,000 to 1,000,000 such fishes in a season, and the combined output of six typical stations in 1919 may be placed at 2,725,000—a cost of $5.50 per thousand.

From these figures it appears that the number of fishes rescued in 1919, if they had been produced and reared in the ordinary way at established plants, would have required 345 pond stations and the actual cost of production would have been about $860,000. To this sum, however, should be added the year's cost of the regular station staffs and general charges for maintenance, which would have been over $2,000,000.

There should also be taken into consideration the initial cost of construction of the pond stations, estimated at not less than $12,000,000. Against these large hypothetical charges is to be placed the actual aggregate cost of the salvage operations in 1919, namely, $31,000.

THE PEARL BUTTON INDUSTRY EMPLOYS 20,000 PEOPLE.

The perpetuation of the fish supply in the Mississippi and its tributaries involves a very important industry besides fishing. Investigations conducted for the Bureau of Fisheries years ago showed an intimate relation between certain kinds of fishes and the mussels, which yield valuable pearls and support a pearl-button industry which gives employment to about 20,000 persons and has a product worth from $5,000,000 to $6,000,000 annually.

The young mussels, of microscopic size when thrown off by their parents in myriads, need to pass the first few weeks of their independent existence on the gills of fishes. If the fishes are not present at the proper time, the mussels can not survive. Furthermore—and this is a most interesting feature of the correlation of fishes and mussels—the young of particular kinds of mussels require the gills of particular kinds of fishes as nurseries.

The black bass is host for several sorts of mussels, the crappies for several others, the catfishes for others. The skipjack, a kind of herring, is the only known host for the best of all mussels; and as this fish is not by any means abundant, its maintenance is of prime importance to the welfare of the button industry. In 1919 more than one and a half million skipjacks were rescued.

AN IMPROVEMENT ON NATURE.

The peculiar requirements of the young mussels having been carefully determined, the Bureau of Fisheries has gone extensively into the business of artificial propagation of pearly mussels by a method which is a vast improvement on nature. The spawning mussels, held in ponds, are at the critical period provided with the special fishes needed for the attachment of the young. The fishes obtained in the rescue operations are turned into the ponds at the time the mussels are spawning and become thickly inoculated. They are then liberated in the open water and distribute themselves and the mussels throughout a wide stretch of river. Thus two important branches of the bureau's work go hand in hand.

The artificial propagation of fresh-water mussels is one of the functions of the United States Fisheries Biological Laboratory located on the Mississippi River near Fairport, Iowa. Each year from 200,000,000 to 300,000,000 young mussels are thus brought in contact with the gills of rescued fishes and given a proper start in life. The maintenance of the mussel supply is thus being greatly aided.

That this work is not a mere experiment, but is yielding practical results, is shown by various pieces of evidence. For instance, pearl buttons have been made from Mississippi River mussels grown from larvæ that had been artificially implanted on the gills of a black bass less than two years before and had been under constant observation. These mussels would have attained full commercial size at the age of four and a half years.

DISTRIBUTION OF FISHES TO OUTSIDE WATERS.

This account of the rescue work would be incomplete if no reference were made to the sending of small numbers of salvaged fishes to waters more or less remote from the Mississippi. These fishes serve the same purpose as do the product of the hatcheries. They are intended for replenishing depleted waters or for stocking newly formed lakes and ponds that may have no fish life or no suitable supply of food or game fishes.

Fishes as taken from the landlocked waters of the Mississippi Valley are not in a condition to stand distant shipment. It is therefore necessary to subject them to a hardening process before it is safe or wise to send them on a long railway journey. The hardening is done at several depots along the river, notably at La Crosse, Wis., and Bellevue, Iowa. At these and several other points are small buildings containing tanks in which the fish are kept, without food, in cool, clear, running water for several days.

The fish, then ready for shipment, are placed in large cans and loaded into railway cars, in which they make their journey in safety and comfort. Minor shipments for short distances may be made in baggage cars, with an attendant.

The new all-steel distributing cars of the Bureau of Fisheries embody the very latest idea in fish transportation. These cars, with their permanent crews and with all modern improvements for keeping fish supplied with water and air, are hauled on fast passenger trains and have been used for forwarding from the Mississippi the special lots of rescued fishes designed for planting in adjoining States.

Sometimes a carload of fish may be taken in its entirety to a single point of deposit, but more frequently detachments are delivered en route to applicants who have been notified in advance, by mail or telegraph, to meet a given train with receptacles for taking their fish away.

Lest there may be created the impression that large numbers of salvaged fishes that should be returned to the parent stream are being diverted to outside waters, it may be stated that in 1919 less than six-tenths of 1 per cent of the fishes saved from the Mississippi floods were consigned to outside waters. This altogether negligible number consisted chiefly of catfishes, sunfishes, crappies, and basses.

From what has already been stated, it must be apparent that this work on which the fisheries service of the Federal Government has voluntarily embarked is of very great value, not only to the States immediately concerned, but also to distant parts of the country, for the food fishes of the Mississippi Basin receive a wide distribution in the trade. As a matter of fact, the importance of this effort as a means of maintaining and increasing the food supply of the country can hardly be equaled in any other field when cost, certain results, and quick returns are taken into consideration.

In most of the States bordering on the Mississippi there is a growing public interest in and urgent demand for a continuation and extension of the rescue work; and along the Ohio, Missouri, and other tributaries of the Mississippi, where there prevail essentially the same conditions as in the main stream, the desirability of this form of food conservation is being seriously considered.

In the districts now only partly covered and in the sections where up to this time it has been impossible to undertake any operations, there exists an opportunity for very productive work. There are unbroken stretches of river 500 miles in length, where the floods are yearly causing large sacrifice of food fishes, on which no attempts at rescue have heretofore been made because of lack of funds and personnel, and the major tributaries of the Mississippi present a virgin field of unknown possibilities.

It should be understood that Congress does not appropriate funds especially for this particular work, and that the money now employed is in reality part of a general appropriation for fish culture, and the persons and equipment detailed for the rescue operations are temporarily drawn from other branches of the service.

What is needed, in order that this service may be conducted in a manner and on a scale that its importance justifies, is specific recognition by Congress through the providing of special funds and personnel, so that the work may not be contingent on the necessities of other duly established activities.

STATEMENT OF HON. HARRY E. HULL, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF IOWA.

Mr. HULL. Gentlemen of the committee, just briefly at the start I want to suggest merely that in your bill you put an amendment on line 6, after the word "operations," by inserting "in the Mississippi Valley." I do that simply so that it will explain its nature better. I realize very well you did not intend to confine its operations to the State of Wisconsin.

Mr. ESCH. Not at all.

Mr. HULL. But the members won't know how far this work can go. It goes the entire length and breadth of the Mississippi Valley, as I understand it.

Then, briefly, I want to call your attention to the importance of the pearl-button industry and how much that industry depends upon work of this character. The pearl-button industry is an industry that was started in the early nineties. It is a very remarkable industry. At the present time it has a product approximately of $90,000,000 and employees some 20,000 people in different States. It practically covers the entire Mississippi Valley, in a good portion of the Eastern States, extending even into the State of Massachusetts and quite extensively into New Jersey, and also in New York, where they have great factories. As you know, the pearl-button industry is the production of pearl buttons, and it is of great importance to the people of this country to have that industry. It produces a button that is much better for the purposes for which it is used than any other button. Up to the time of the introduction of this industry they depended largely upon bone for their small buttons. To-day a much better button, from the sanitary standpoint, and a cheaper button for the people of this country, is produced from these mussels, and everybody wears them. All of you have them on you right now. And it is due to the fact they have found they can use the clam, which we used to go out and dig up in the bottom of the river and wonder what use could be made of it. It produces the pearl button to-day.

That industry has got to find a way for the reproduction of the clams in the river bottoms, because largely they went out in the beds of the river and dug up the clams that had been formerly laid there

and nobody paid any attention. To-day they are running short, and it is largely due to the fact that the mussel does not naturally reproduce itself in sufficiently large quantities for the industry.

Mr. DAVIS. If the pearl industry should receive the benefit of the very valuable assistance which would be carried by the enactment of this bill I presume they would be willing to waive their claim for a protective tariff, would they not?

Mr. HULL. If you wanted to kill the industry and transfer it to Japan, they would. We do not think so. But that is another angle to the situation, of course.

This rescue work, I think, is of wonderful importance to the people of this country, not only in the production of food, but also in the production of pearl buttons. These gentlemen who have the scientific knowledge have covered the case very completely. The inoculation of the fish with the clam larvæ does not hurt the fish at all. At the present time this work is carried on to some extent, but only in an experimental way, at the Fair Port biological station, which is located in my district, and that is how I come to know something about it. Also, the industry is very extensive in my district, and in the town of Muscatine the largest factory is located of any of the factories in my district. Now, this Fair Port biological station is one of the greatest in the world; I guess it is the best-equipped biological station in the world.

Dr. SMITH. Fresh water.

Mr. HULL. It is a fresh-water biological station. I attended the dedication of it last summer, and I was very much amazed to notice the scientific people gathered there. They were gathered there from all over this country; practically every university had scientific men there, telling of the great benefit to the people of this country such a station would be.

Mr. DAVIS. Over what territory do the operations now extend with regard to gathering these shells?

Mr. HULL. Practically 20 States are covered at the present time, and I presume there are more—it has been expanding all the while—and there is no place, I presume, except in the Mountain States, but where the clam can be propagated.

Mr. DAVIS. Are they gathered by these manufacturing concerns or largely by parties who gather for themselves?

Mr. HULL. The clam gatherers are largely individuals who go to work and gather the clams, and they have boats and processes by which to do it, and they sell the clams just like you sell corn or anything else. It runs from $25 to $100 a ton, I guess. Sometimes they run very high and then they go down, as they get more. But they are going higher all the while. The general trend of the market is higher, because they are more scarce.

That is the object of my appearing before you to urge the passage of a bill like this, which, as has been demonstrated by other gentlemen here, would very extensively expand the industry; and the pearl-button industry, I think, is one of the important industries in this country to-day, producing, as it does, a cheaper button, a better button, and a button everybody uses. Its benefits go to the common people, and it gives them a very, very high-grade button.

Mr. RANDALL. Is it not a fact, also, that in these mussels you find a large number of pearls?

Mr. HULL. Yes; they can find pearls, but that is just a side issue. They do find them and there are men all the while running there. Wherever they are picking up clams on the bed of the river there are men waiting to hear of some fellow finding a pearl, and if they hear of them, they go and try to negotiate. But that, of course, is purely a side issue.

STATEMENT OF MR. W. P. FICKETT, OF NEW YORK, N. Y., REPRESENTING THE BUTTON MANUFACTURERS' ASSOCIATION.

Mr. FICKETT. I might say, Mr. Chairman, we are very much in favor of this bill and we want to support it. We have prepared a moving-picture film which outlines this rescue work very thoroughly and, if arrangements could be made with the committee to show it we would be glad to do so.

The CHAIRMAN. That would have to be shown down in the Bureau of Fisheries?

Mr. FICKETT. Yes; we could show it there. This film tells the story of this work in a way, I think, to impress you very thoroughly.

Dr. SMITH. May I ask Mr. Fickett whether this motion-picture film to which he alludes was prepared by and at the expense of the pearl-button manufacturers?

Mr. FICKETT. Yes, sir; the pearl-button manufacturers had this picture taken at their own expense when we were doing the rescue work Dr. Smith referred to this fall. The doctor has seen the picture and I think he knows what it is.

Dr. SMITH. May I say just a word apropos of the suggestion of Congressman Hull. He has mentioned the desirability of an amendment in line 6, and will you permit me to call attention to the fact that in a communication on this bill, sent at your request by the Secretary of Commerce, the same amendment is urged.

Mr. FICKETT. And may I add that the pearl-button manufacturers' association concur in that amendment and would like to see this bill made as broad as possible.

Mr. ESCH. I wish to thank the committee for this hearing.

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